teague, Virginia; 20°.3 at Indianola, Texas, and 20°.1 at Norfolk, Virginia. The smallest monthly ranges are: 1°.3 at Eastport, Maine; 2°.7 at San Francisco, California; 5°.9 at Portland, Oregon; 6°.7 at Portland, Maine; 7°.2 at Sandy Hook, New Jersey, and 8° at New London, Connecticut. Observations were not made on account of ice during the month as follows: Grand Haven, Michigan from 4th to 10th; Cleveland, Ohio, from 1st to 22d, 23d to 26th and 31st; Toledo, Ohio, from 1st to 21st; Sandusky, Ohio, from 1st to 19th; Chicago, Illinois from 1st to 23d:

Temperature of water for March, 1884.

Station.	Temperature at bottom. Max.	Temperature at bottom. Min.	Range.	Average depth, feet and inches.		Mean temperature of the air at station.
	°	°	°	ft.	in.	°
Atlantic City, New Jersey	48.3	32.0	16.3	4	5	38.6
Alpena, Michigan*						
Augusta, Georgia	66.0	45.0	21.0	17	4	59.6
Baltimore, Maryland	48.6	35.8	12.8	9	6	44.0
Block Island, Rhode Island	41.5	29.4	12.1	8	3	36.0
Boston, Massachusetts	40.8	29.9	10.9	22	2	33.5
Buffalo, New York*						
Canby, Fort, Washington	51.0	40.7	10.3	16	6	44.0
Cedar Keys, Florida	76.0	50.3	25.7	12	2	66.7
Charleston, South Carolina	65.6	50.9	14.7	40	11	59.8
Chicago, Illinois†	42.3	38.3	4.0	8	7	34.2
Chincoteague, Virginia	53.5	32.5	21.0	4	9	42.3
Cleveland, Ohio†	38.1	37.4	0.7	14	0	33.6
Detroit, Michigan*						
Delaware Breakwater, Delaware	54.1	27.1	27.0	8	7	40.1
Duluth, Minnesota*						
Eastport, Maine	33.3	32.0	1.3	14	9	28.2
Escanaba, Michigan*						
Galveston, Texas	71.5	50.3	21.3	12	1	64.8
Grand Haven, Michigan†	44.3	32.1	12.2	19	0	32.0
Indianola, Texas	72.8	52.5	20.3	9	5	65.7
Jacksonville, Florida	73.0	59.0	14.0	18	0	66.3
Key West, Florida	82.2	69.0	13.2	17	7	74.6
Mackinaw City, Michigan*						
Macon, Fort, North Carolina	64.5	49.0	15.5	2	10	54.8
Marquette, Michigan*						
Milwaukee, Wisconsin*						
Mobile, Alabama	66.0	52.0	14.0	16	1	62.2
New Haven, Connecticut	41.6	29.9	11.7	15	3	33.6
New London, Connecticut	41.8	33.8	8.0	12	2	35.8
New York City	44.0	31.1	12.9	10	2	37.5
Norfolk, Virginia	58.5	38.4	20.1	16	7	50.3
Pensacola, Florida	68.1	57.9	10.2	17	6	63.1
Portland, Maine	36.4	29.7	6.7	16	2	33.7
Portland, Oregon	48.6	42.7	5.9	56	4	45.4
Provincetown, Massachusetts	41.2	31.5	9.7	10	5	34.6
Sandusky, Ohio†	44.0	34.3	9.2	10	10	34.9
Sandy Hook, New Jersey	41.4	34.2	7.2	1	7	38.0
San Francisco, California	55.4	52.7	2.7	39	3	54.0
Savannah, Georgia	65.8	48.8	17.0	10	4	61.7
Smithville, North Carolina	64.1	49.0	15.1	10	0	56.2
Toledo, Ohio†	48.5	38.6	9.9	12	6	35.2
Wilmington, North Carolina	63.2	47.3	15.9	19	7	58.1

* Frozen entire month. † Frozen part of month: see text.

VERIFICATIONS.

INDICATIONS.

The detailed comparison of the tri-daily indications for March, 1884, with the telegraphic reports for the succeeding twenty-four hours, shows the general average percentage of verifications to be 82.67 per cent. The percentages for the four elements are: weather, 87.26; direction of the wind, 76.51; temperature, 80.56; barometer, 87.94 per cent. By geographical districts they are: for New England, 83.60; middle Atlantic states, 83.48; south Atlantic states, 84.36; eastern Gulf states, 81.42; western Gulf states, 79.73; lower lake region, 84.00; upper lake region, 83.68; Ohio valley and Tennessee, 84.15; upper Mississippi valley, 82.96; Missouri valley, 78.94; north Pacific coast region, 72.37; middle Pacific coast region, 88.16; south Pacific coast region, 92.11. There were five omissions to predict, out of 3,448 or 0.15 per cent. Of the 3,443 predictions that have been made, one hundred and eleven, or 3.22 per cent., are considered to have entirely failed; one hundred and forty-four, or 4.18 per cent., were one-fourth verified; four hundred and fifty-one, or 13.10 per cent., were one-half verified; six hundred and eight, or 17.66 per cent., were three-fourths verified; 2,129, or 61.84 per cent., were fully verified, so far as can be ascertained from the tri-daily reports.

CAUTIONARY SIGNALS.

During March, 1884, two hundred and forty-six cautionary signals were ordered. Of these, two hundred, or 81.30 per cent., were justified by winds of twenty-five miles or more, per hour, at or within one hundred miles of the station. Sixty-two cautionary off-shore signals were displayed, of which number, fifty-four, or 87.09 per cent., were fully justified both as to direction and velocity; sixty-one, or 98.38 per cent., were justified as to direction; and fifty-five, or 88.71 per cent., were justified as to velocity. Three "northwest" signals were displayed on the lakes; all of these were justified both as to direction and velocity. Three hundred and eleven signals of all kinds were displayed, two hundred and fifty-seven, or 82.60 per cent., being fully justified. These do not include signals ordered at display stations, where the velocity of the wind is only estimated. Of the above cautionary off-shore signals, sixty were changed from cautionary; the "northwest" signals were also changed from cautionary. In seventy cases, winds of twenty-five miles or more, per hour, were reported for which no signals were ordered.

The verification of railway signals issued during the month by the "Ohio Meteorological Bureau," Professor T. C. Mendenhall, Director, was as follows:

Temperature, 92 per cent.; precipitation, 88 per cent.

The signals above referred to consist of colored symbols displayed from the sides of the baggage cars on various railroads in Ohio, and represent the daily forecasts as telegraphed from the office of the Chief Signal Officer to said bureau.

ATMOSPHERIC ELECTRICITY.

AURORAS.

An auroral display which occurred on the evening of the 28th was observed throughout the northern part of the United States. This was the most extensively observed display of the month, and appears to have been most brilliant from the lake region westward to the Pacific. The display occurring on the evening of the 1st was generally observed in the lake region and New England. On the 25th a display was observed at New River Inlet, North Carolina, which was not reported from any other station. The following reports relate to the display of the 28th:

Provincetown, Massachusetts: auroral display from 10.50 p. m. of the 28th, until midnight, consisting of faint beams reaching nearly to the zenith.

Fall River, Massachusetts: a brilliant auroral display occurred on the 28th, lasting from 8 to 11 p. m. The auroral light extended over about 60° of the northern horizon and beyond the zenith.

New Haven, Connecticut: an auroral arch, extending over about 100° of the northern horizon, was visible in the northern sky at 7.30 p. m. of the 28th. The display was of moderate brilliancy and was obscured by clouds at 10 p. m.

Rochester, New York: aurora from 7.20 to 11 p. m. of the 28th; very bright at 9 p. m., when beams of pale yellow color extended upward 65° from the horizon.

Oswego, New York: aurora at 8.30 p. m. of 28th, consisting of a band of white light which extended from northwest to east. The display reached its maximum brilliancy at 8.55 p. m. and disappeared at 9.30 p. m.

Alpena, Michigan: aurora at 8.15 p. m. of 28th, consisting of a diffuse light with a few pale streamers having an apparent motion from east to west.

Duluth, Minnesota: faint aurora at 9.45 p. m. of the 28th, consisting of flashes of pale green light, at times reaching upward to the zenith.

Escanaba, Michigan: a brilliant auroral display occurred on the 28th. It was first seen at 7.54 p. m. Four minutes later an arch formed near the horizon and gradually moved upward until it reached a point 15° south of the zenith. When the arch reached the zenith, bright, yellow beams, having a swaying motion, shot upward from the northern horizon. The display had entirely faded away at 9.50 p. m.